Design and Development of a Generic
Architecture for Apparel Manufacturing : Volume IV,

Recruit Induction Center Architecture: Function and Information Models for the Uniform Distribution Process

Research Sponsored by:

Volume IV

U.S. Defense Logistics Agency

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13. ABSTRACT *(Maximum 200 words)*

Research has been carried out to design and develop a generic architecture for an apparel enterprise that can serve as a blueprint for a computer-integrated apparel enterprise (CIAE). The Apparel Manufacturing Architecture (AMA) -- the first comprehensive architecture for manufacturing -- has been developed and validated in close collaboration with the apparel industry. AMA consists of a set of models the core of which is the *information* model which defines the schema of the shared information base for an apparel enterprise. The *function* model component of the architecture specifies how the activities carried out in an apparel manufacturing enterprise interact with each other through the shared information base. The third component of AMA, the *dynamics* model, describes how the interactions among the enterprise activities take place over time. The Recruit Induction Center Architecture (RICA) models the uniform distribution process at the Recruit Induction Center (RIC).

Volume IV presents the
Volume IV models the uniform distribution process at the Recruit Induction Center (RIC).

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PREFACE

The Recruit Induction Center Architecture (RICA) consists of the Function and Information Models of the uniform distribution process at recruit induction centers (RIC). The research on the development of RICA has been funded by the US Defense Logistics Agency.

RICA has been developed based on visits by the DLA Joint Working Group to the following RICs:

- US Coast Guard in Cape May, New Jersey
- US Army in Ft. Jackson, South Carolina
- US Marine Corps in Parris Island, South Carolina
- US Air Force in San Antonio, Texas
- US Navy in Orlando, Florida.

The personnel at the various RICs deserve sincere thanks and appreciation for their valuable input during the visits.

Any comments on RICA including suggestions for enhancements are welcome.

Sundaresan Jayaraman
Atlanta, Georgia

Recruit Induction Center Architecture: The Function Model

Operate Uniform Distribution Center (A0)

Description: Prepare recruits and distribute uniforms, accessories and towels to them. Also carry out support activities such as management of inventory and resources.

Viewpoint: Managers responsible for the day-to-day distribution activities.

Purpose: Develop an architecture for the implementation of computer-aided management of the uniform distribution center to facilitate customer-driven uniform manufacturing.

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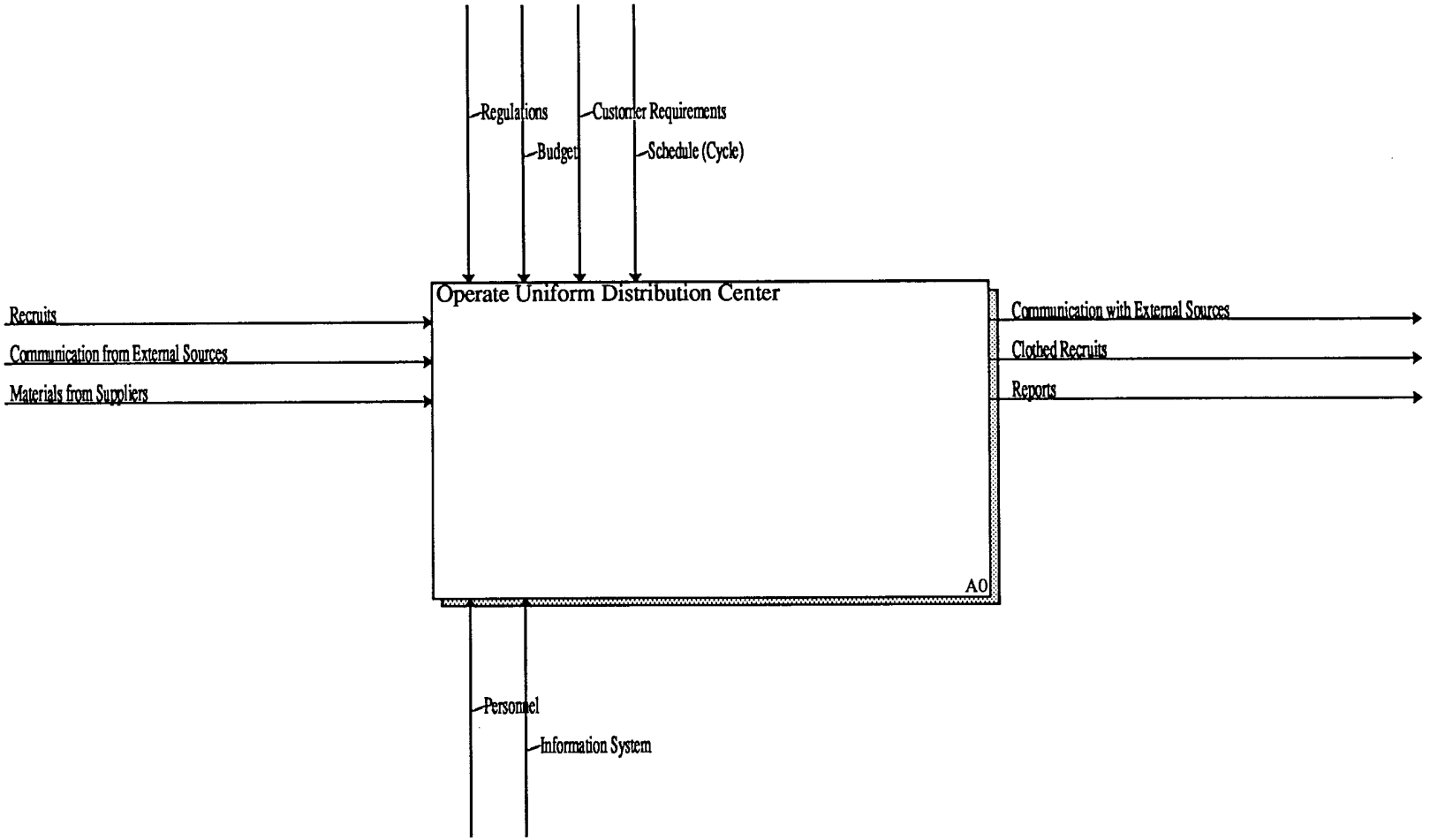

Node:A-0	Title:Operate Uniform Distribution Center (Context)	Number:

Issue Material to Recruits (A1)

Prepare the recruits; issue accessory items and towel. Issue work and dress uniforms; if necessary alter uniforms to suit each recruit's measurements. Place special orders for items not in the typical size range.

Manage Inventory (A2)

Receive, stock and distribute goods. Reorder goods as needed.

Manage Resources (A3)

Manage people, facilities, and funds and initiate request for purchase. Generate reports covering the utilization of the resources.

Solve Problems (A4)

Communicate to DPSC any changes in orders and information about defects in the purchased goods. Resolve these issues in consultation with DPSC.

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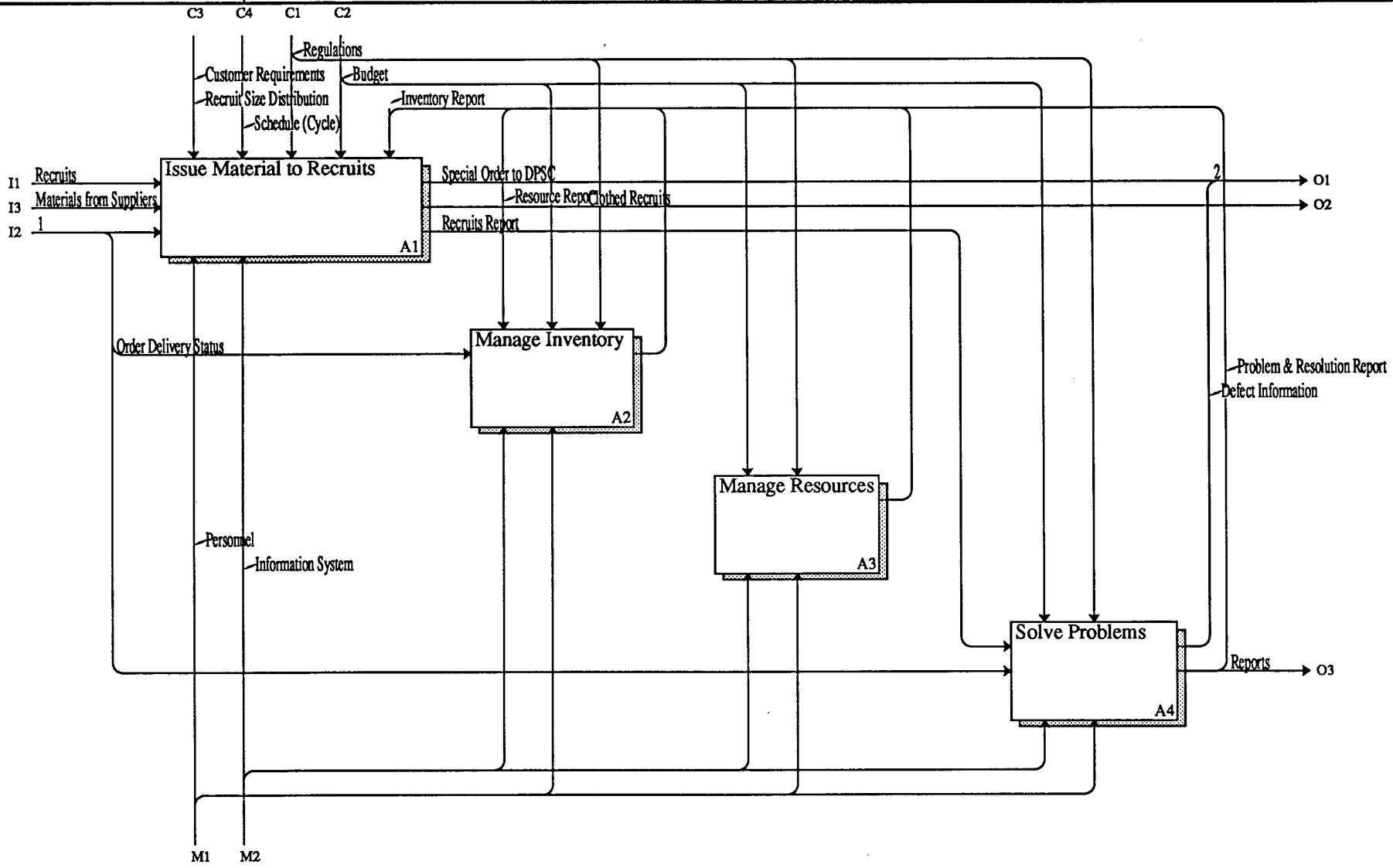

1. Communication from External Sources
2. Communication with External Sources

Node:A0	Title:Operate Uniform Distribution Center	Number:

Prepare Recruits (A11)

Issue towels and accessory items to recruits and give them hair cuts.

Issue Work Uniform (A12)

Measure the recruits and issue work uniforms. If necessary, make the required alterations to the uniform; send out request for special order.

Issue Dress Uniform (A13)

Issue dress uniform and alter them as appropriate.

Process Special Orders (A14)

Determine if special orders are needed and place them with DPSC. Track special orders, issue the uniforms and maintain reports about special orders.

Manage Issue Process (A15)

Collect information about issues, alterations, special orders and quality problems, and prepare summary reports from them.

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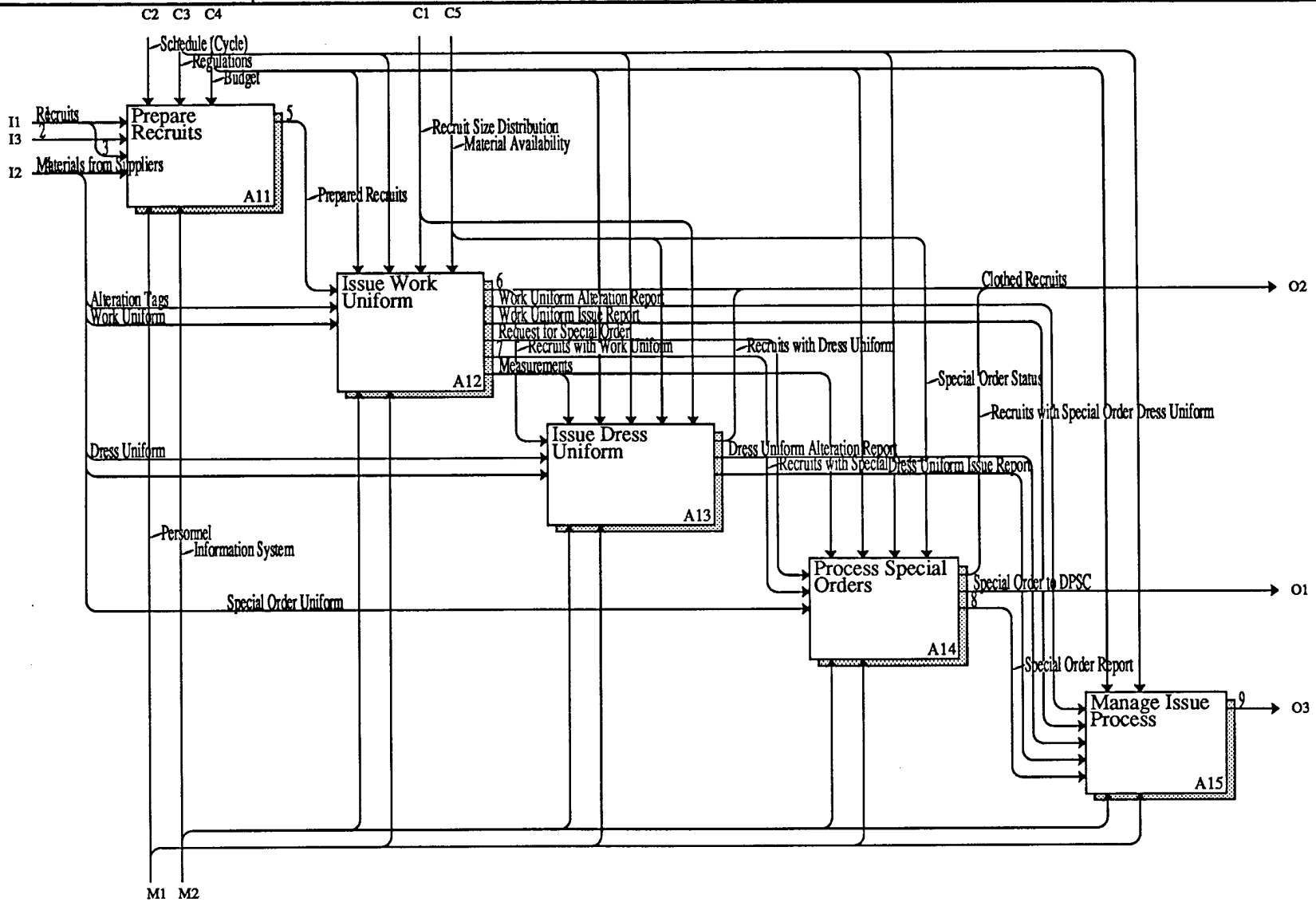

1. Red Tag Recruits
2. Communication from External Sources
3. Regular Recruits
4. Initial Items
5. Prepared Recruits
6. Recruits with Dress Uniform
7. Recruits with Special Orders
8. Special Order Report
9. Recruits Report

Node:A1	Title:Issue Material to Recruits	Number:

Issue Towels (A111)

Issue towels to recruits.

Issue Accessory Items (A112)

Issue accessory items such as sneakers and shorts to the recruits.

Give Hair Cut (A113)

Give hair cuts to recruits.

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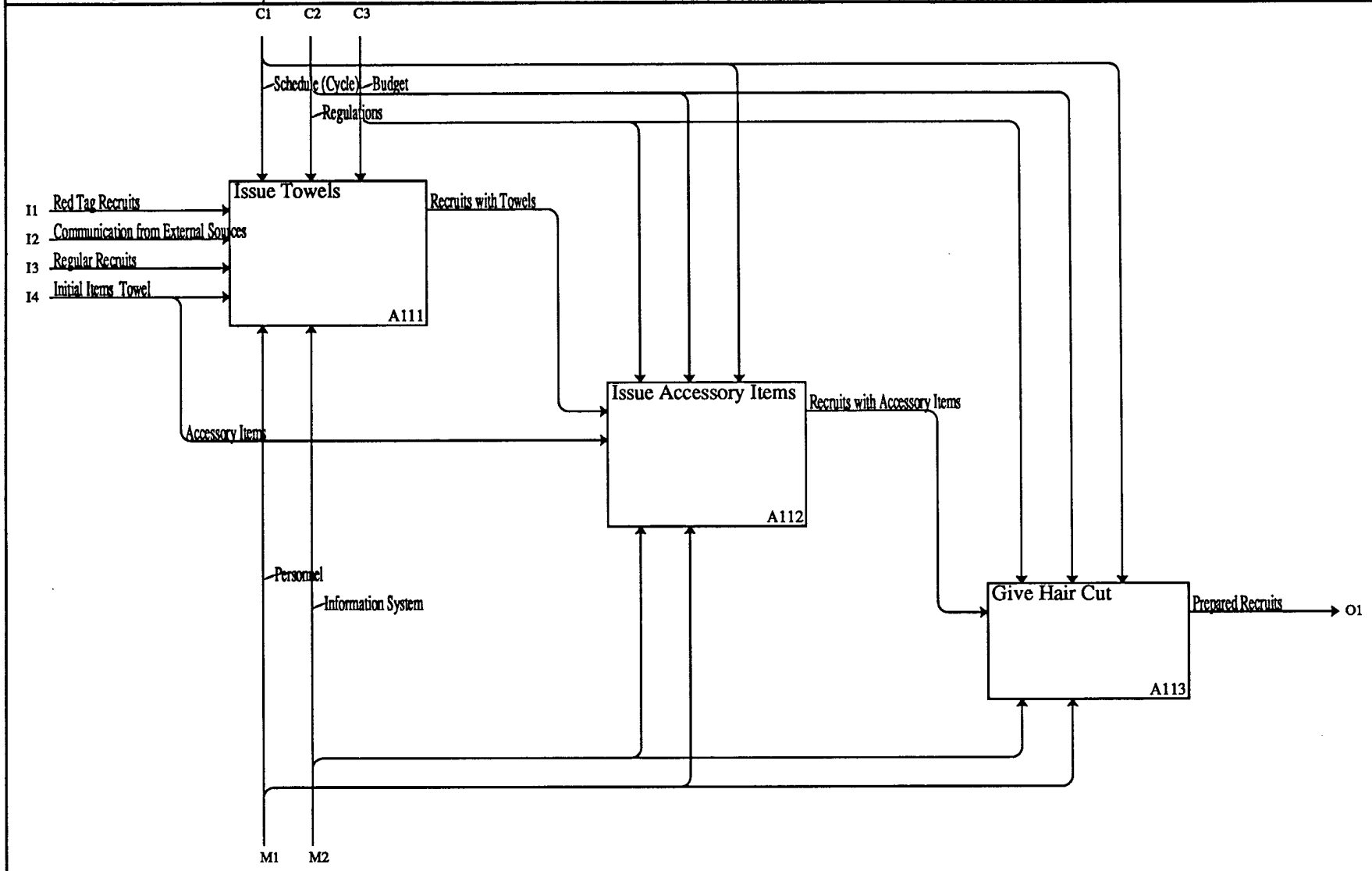

Node:A11	Title:Prepare Recruits	Number:

Measure Recruits for Work Uniform (A121)

Measure each recruit for different garments, such as trousers and shirts and other items such as shoes. The measurements may be mentioned quantitatively (e.g., sleeve length) or qualitatively (e.g., neck can be described as "sloping long neck," "square medium neck," and so on). Certain measurements are required only for special orders and these are entered on DD1111.

Give Work Uniform (A122)

Issue work uniforms that are closest to the recruit's measurements.

Fit Work Uniform (A123)

Indicate the alterations that need to be made to the work uniform to fit the recruit. If necessary, exchange the uniform that has been issued to the recruit with a different one that fits the recruit better.

Alter Work Uniform (A124)

Alter work uniforms as required to correctly fit the recruit. This is done very infrequently

Return Work Uniform (A125)

Returned altered work uniforms to the recruits.

Collect Measurement & Data Sheets (A126)

Collect data from standard data sheets for work uniforms issue and fitting. In case of any error in the data, return the data sheets to the recruits and/or personnel responsible for fitting uniforms.

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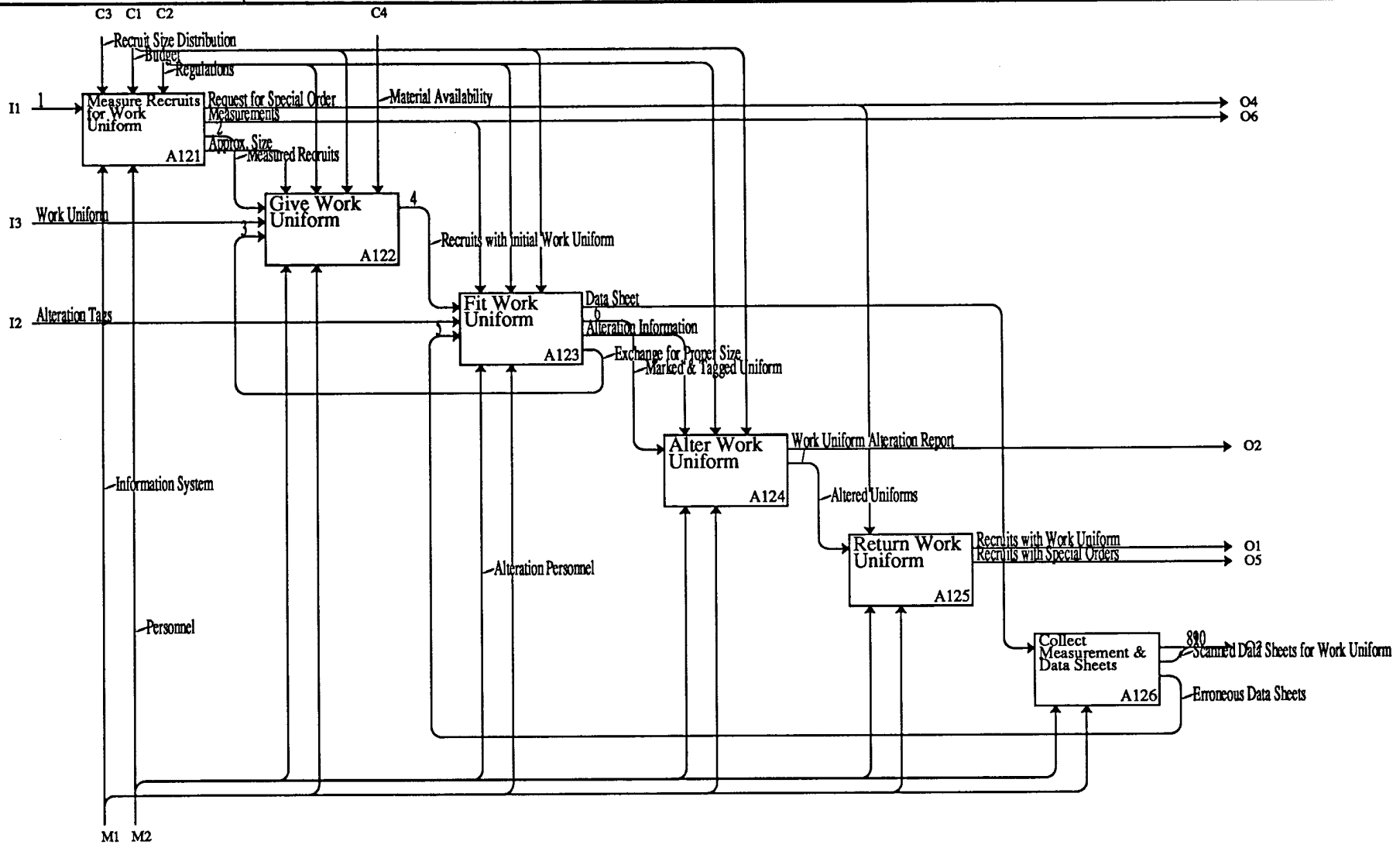

1. Prepared Recruits
2. Measured Recruits
3. Exchange for Proper Size
4. Recruits with initial Work Uniform
5. Erroneous Data Sheets
6. Marked & Tagged Uniform
7. Altered Uniforms
8. Work Uniform Size Forms
9. Work Uniform Size Forms
10. Work Uniform Issue Report

Node:A12	Title:Issue Work Uniform	Number:

Measure Recruits for Dress Uniform (A131)

Measure each recruit for the dress uniform. The measurements may be mentioned quantitatively (e.g., sleeve length) or qualitatively (e.g., neck can be described as "sloping long neck," "Square medium neck", and so on). Certain measurements are required only for special orders and these are entered on DD1111.

Give Dress Uniform (A132)

Issue dress uniforms that are closest to the recruit's measurements.

Fit Dress Uniform (A133)

Indicate the alterations that need to be made to the dress uniform to fit the recruit. If necessary, exchange the uniform that has been issued to the recruit with a different one that fits the recruit better.

Alter Dress Uniform (A134)

Alter dress uniforms as required to correctly fit the recruit.

Inspect Dress Uniform (A135)

Inspect altered uniforms. If they are ill-fitting, return them to the alteration section.

Collect Measurement & Data Sheets (A136)

Collect data from standard data sheets for dress uniforms issue and fitting. In case of any error in the data, return the data sheets to the recruits and/or personnel responsible for fitting uniforms.

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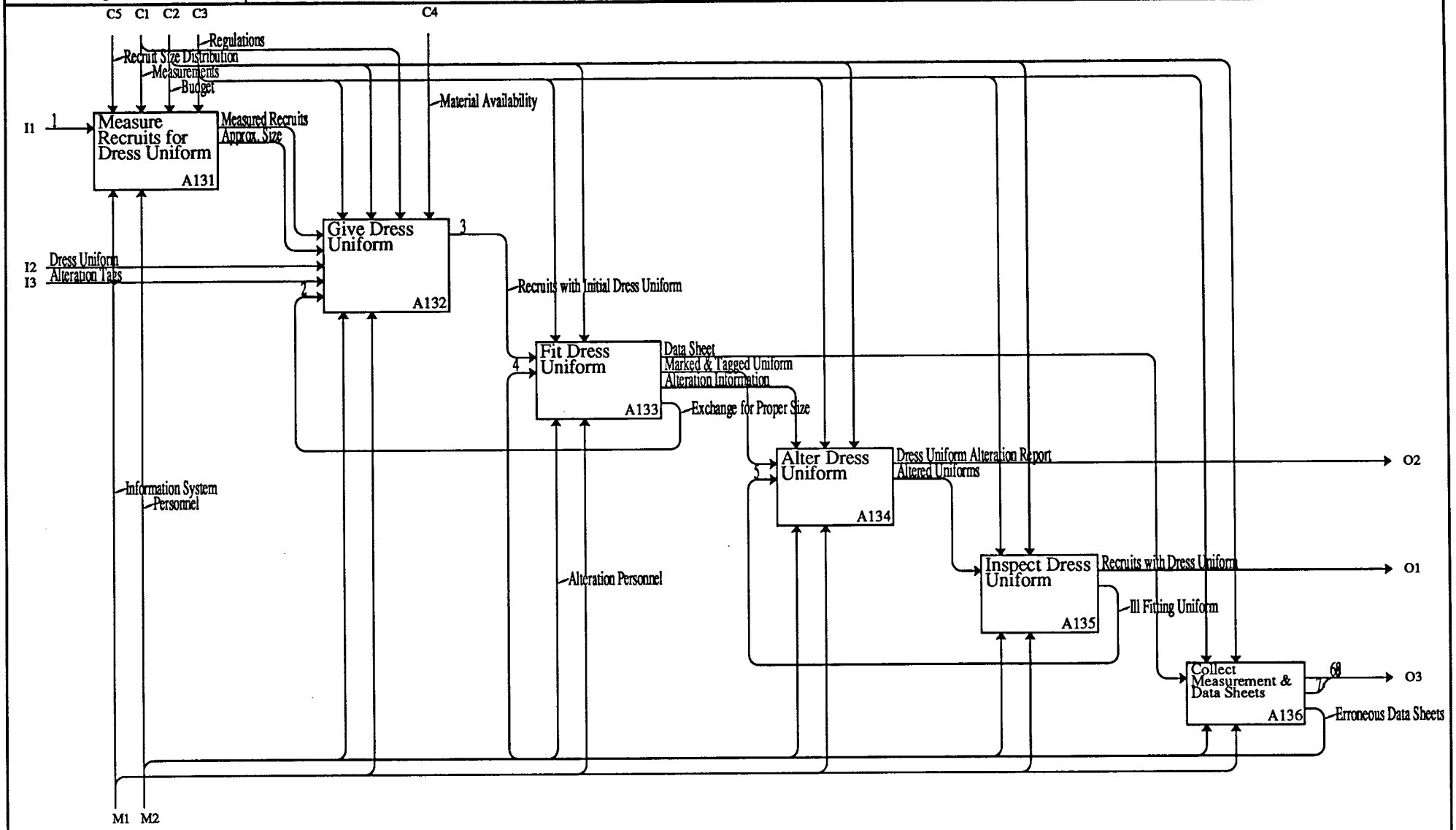

1. Recruits with Work Uniform
2. Exchange for Proper Size
3. Recruits with Initial Dress Uniform
4. Erroneous Data Sheets
5. Ill Fitting Uniform
6. Dress Uniform Size Forms
7. Scanned Data Sheets for Dress Uniform
8. Dress Uniform Size Forms
9. Dress Uniform Issue Report

Node:A13	Title:Issue Dress Uniform	Number:

Determine Need for Special Order (A141)

When a request is made, determine the need for a special order based on measurements, current inventory and budgetary constraints.

Place Order with DPSC (A142)

Place special orders with DPSC based on the requirements.

Review Order Status Periodically (A143)

Follow-up with DPSC to ensure timely delivery of special orders.

Fit and Issue Uniform Items (A144)

Fit and issue the special order uniforms to the recruits for whom they were ordered.

Prepare Reports (A145)

Prepare reports about special orders, issue and stock of special order items.

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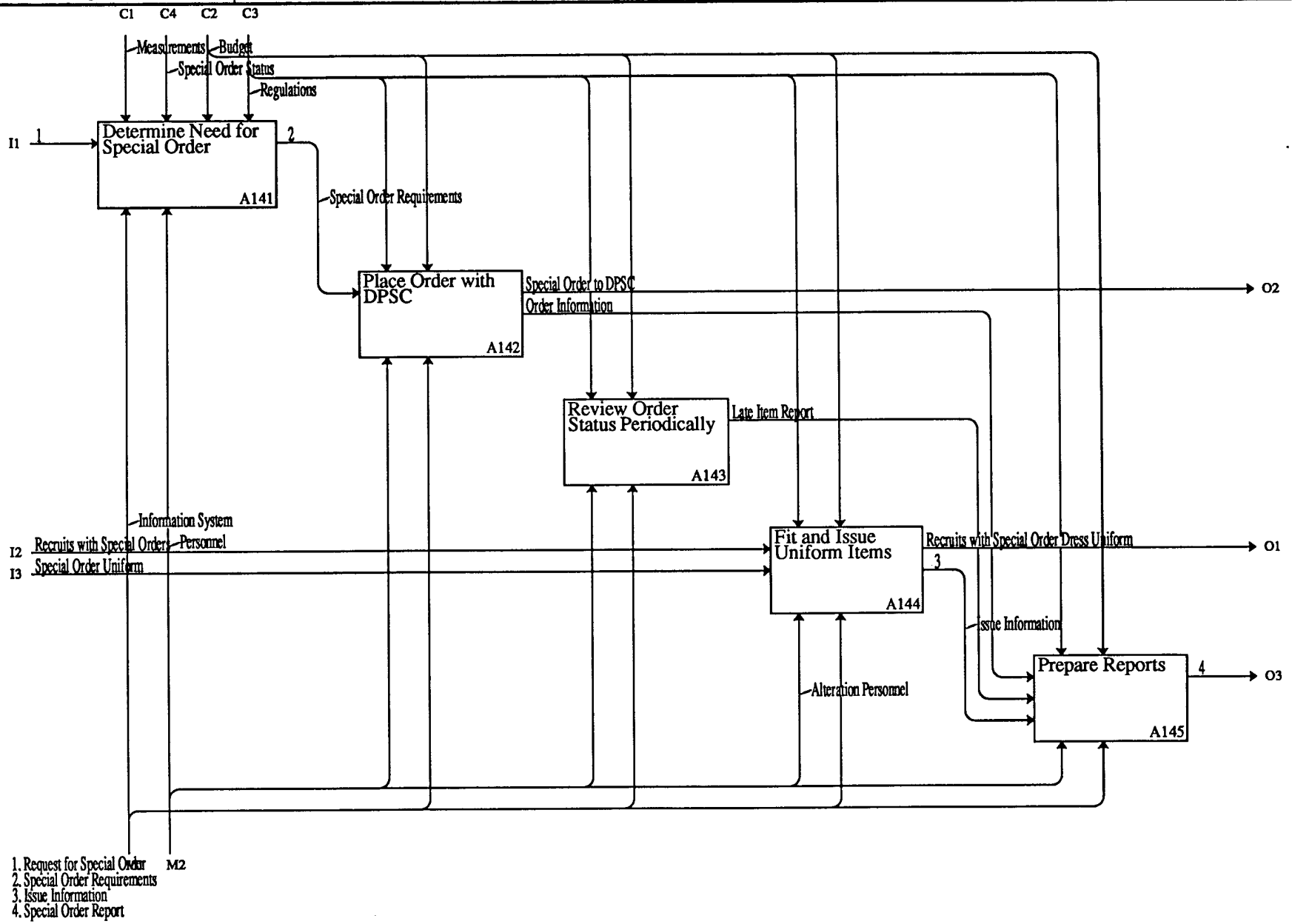

Node:A14	Title:Process Special Orders	Number:

Collect & Organize Measurement Slips (A151)

Collect all measurement slips from remits and organize them for storage.

Collect & Organize Data Sheets (A152)

Collect data sheets and generate information to prepare issue reports.

Prepare QDRs (A153)

Prepare Quality Deficiency Reports from measurement slips and data sheets.

Prepare Non-Quality Problem Reports (A154)

Prepare non-quality problem reports based on data sheet reports and measurement slips.

Prepare Summary Reports (A155)

Prepare comprehensive summaries of both QDRs and non-quality problem reports.

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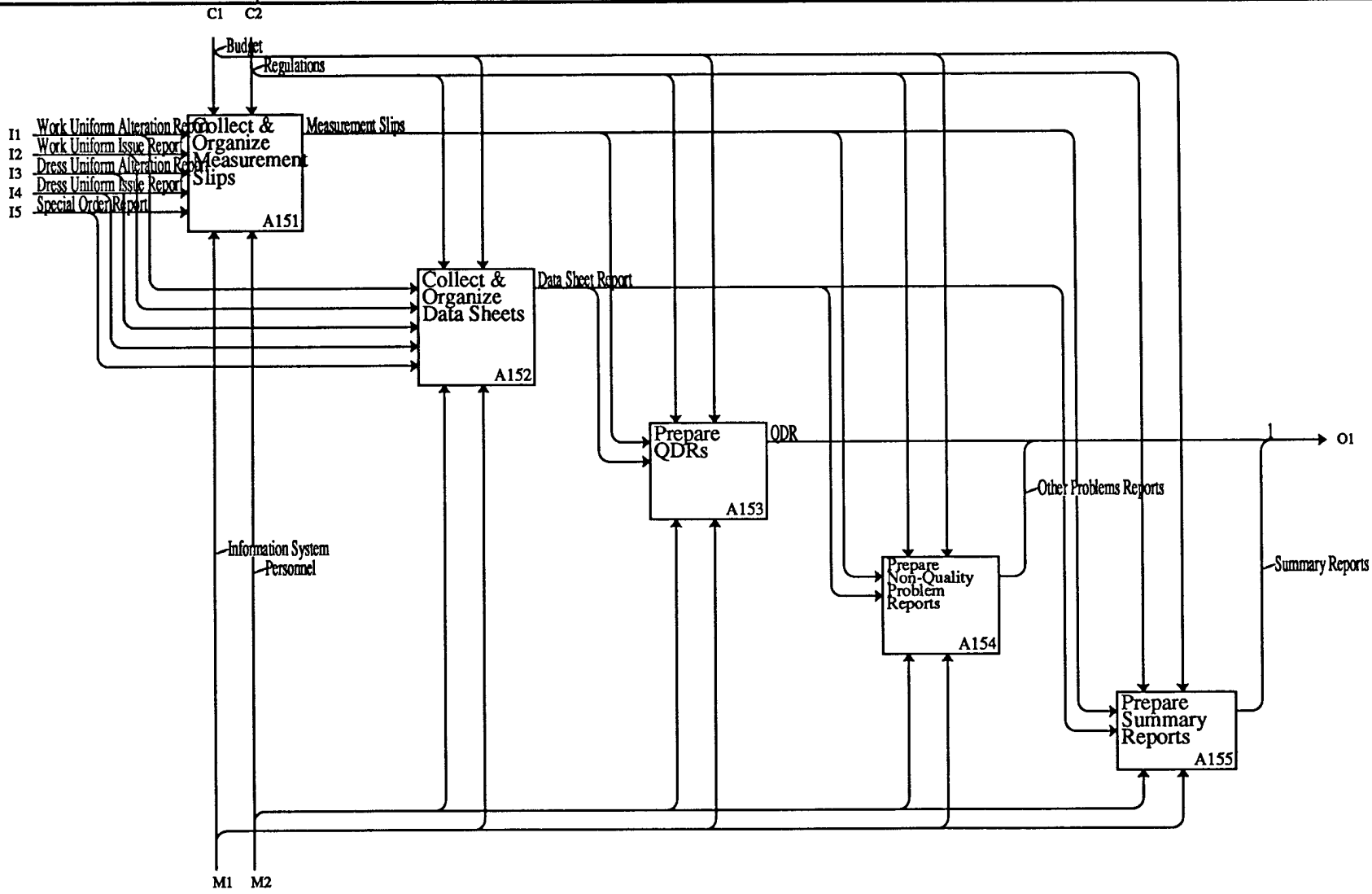

1. Recruits Report

Node:A15	Title:Manage Issue Process	Number:

Receive Goods (A21)

Receive garments and accessories from suppliers.

Stock Goods (A22)

Stock goods at storage locations and update inventory data.

Reorder Goods (A23)

Reorder goods as per requirements.

Take and Record Inventory (A24)

Check the current inventory and update inventory data.

Survey Garments (A25)

Physically survey stored garments, compare with inventory data and generate inventory reports.

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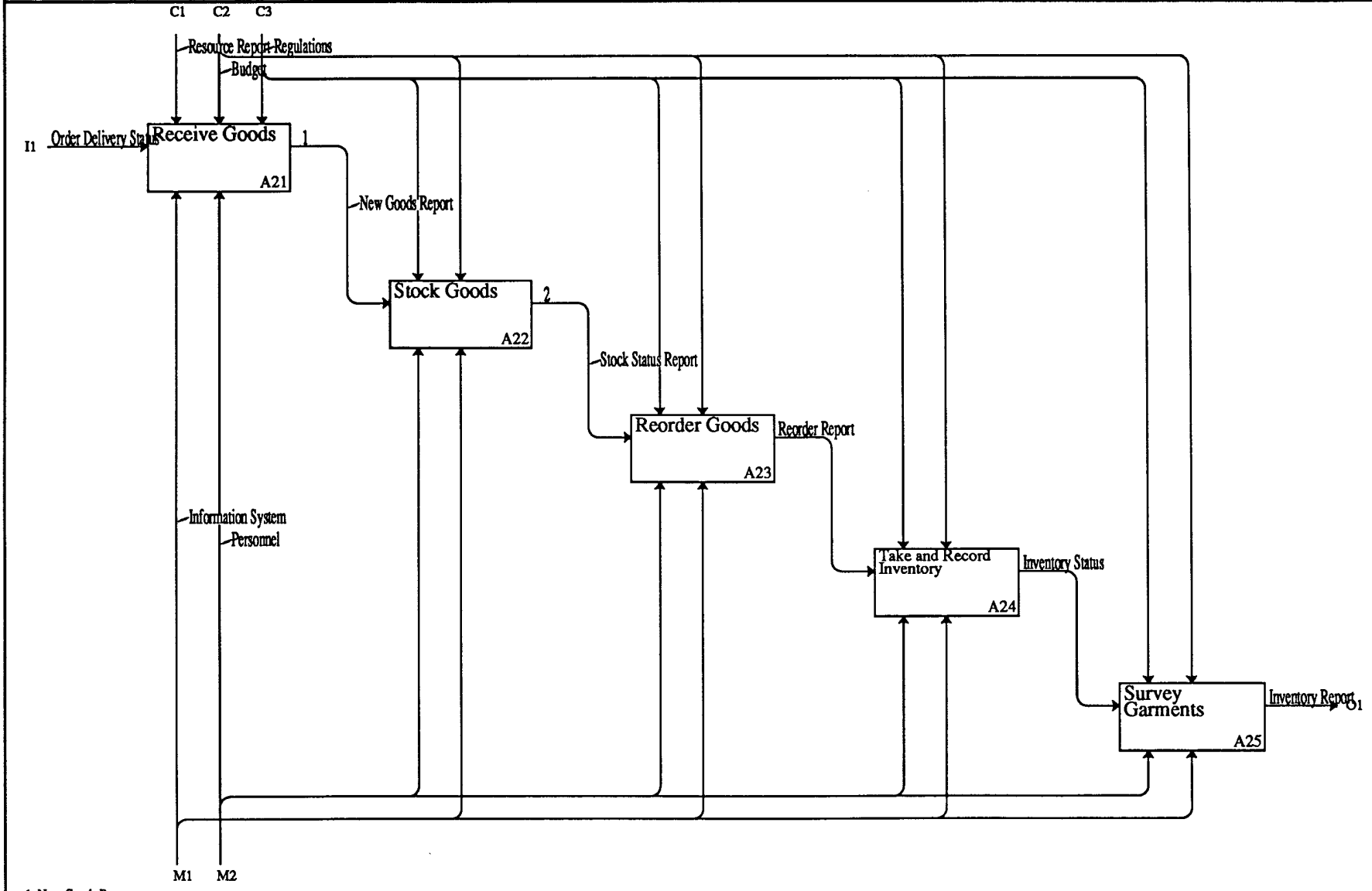

1. New Goods Report
2. Stock Status Report

Node:A2	Title:Manage Inventory	Number:

Manage People (A31)

Manage people involved in the distribution activities by assigning them to specific tasks and following up on the assignments.

Manage Facilities (A32)

Manage the facilities of the distribution center by assigning them to specific tasks and following up on the assignments.

Manage Funds (A33)

Manage funds by appropriate them for various activities through a budget. Record the actual amounts spent against the appropriations.

Initiate Request for Purchase (A34)

Based on the requirements, budget and the regulations, initiate request for the purchase of goods.

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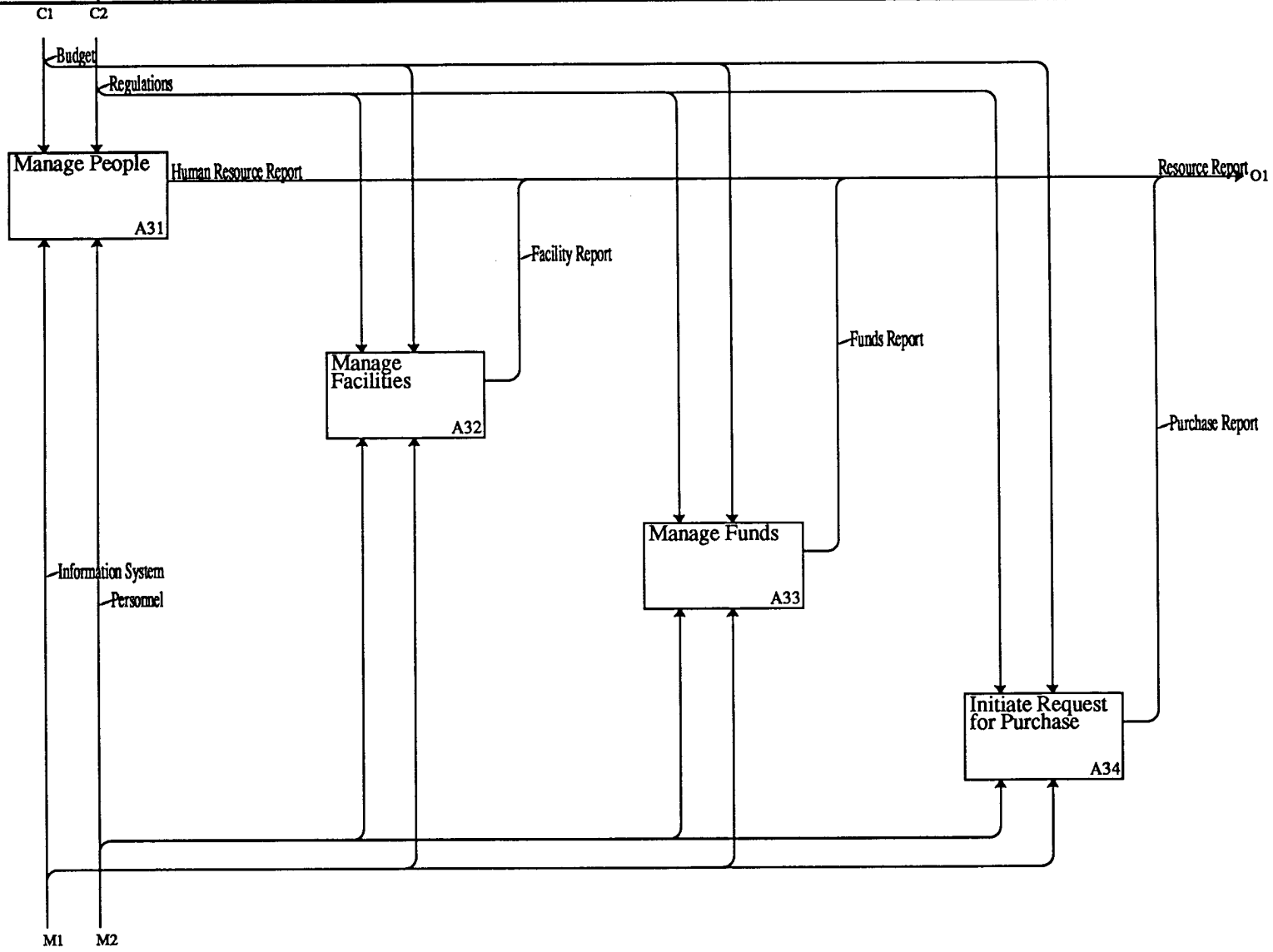

Node:A3	Title:Manage Resources	Number:

Process Changes (A41)

Prepare information regarding changes in current orders for communication to DPSC.

Solve Other Problems (A42)

Deal with defects in goods and other problems.

Deal with DPSC (A43)

Communicate changes in orders and other special needs to DPSC.

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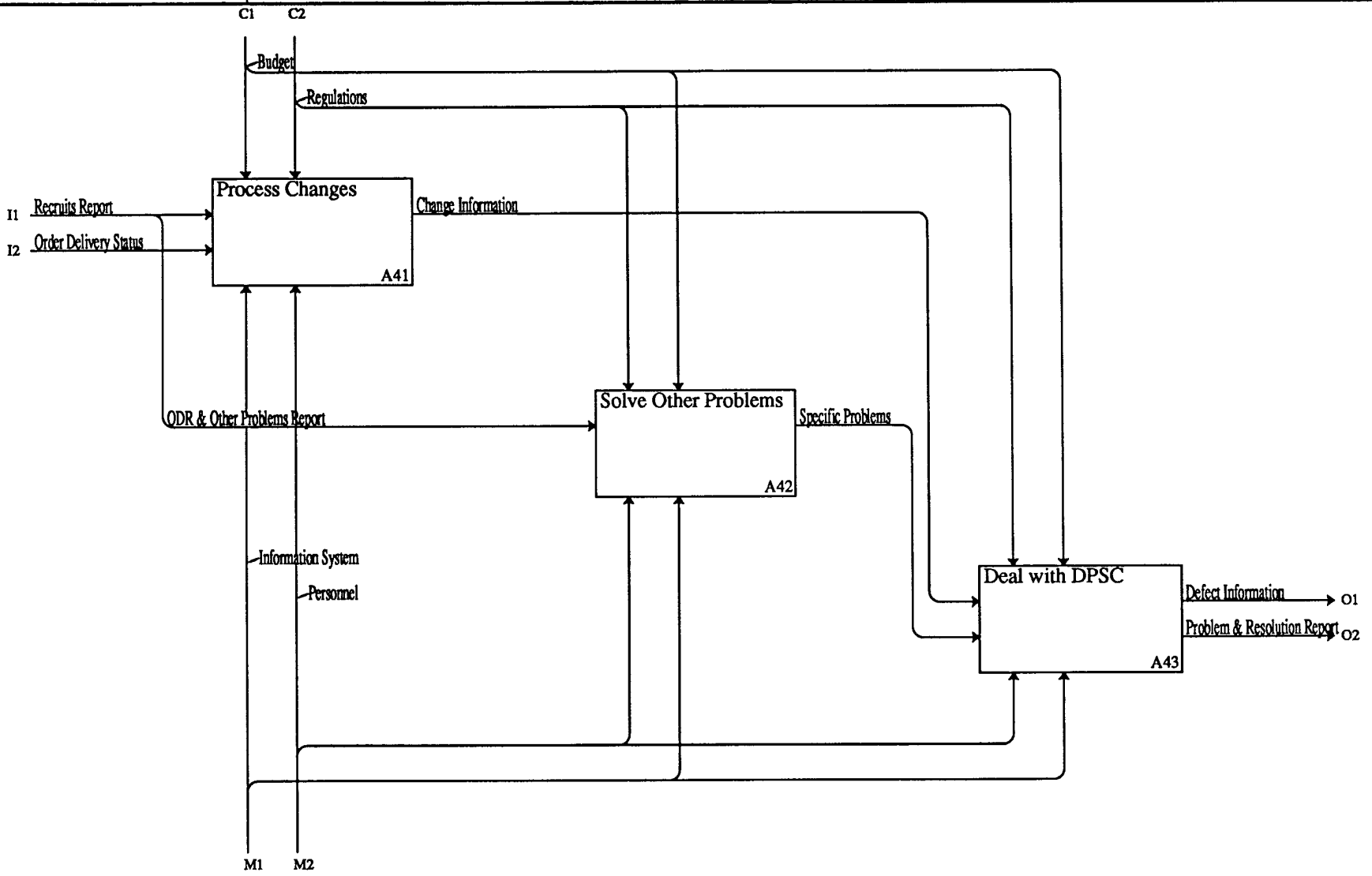

Node:A4	Title:Solve Problems	Number:

Recruit Induction Center Architecture: The Information Model

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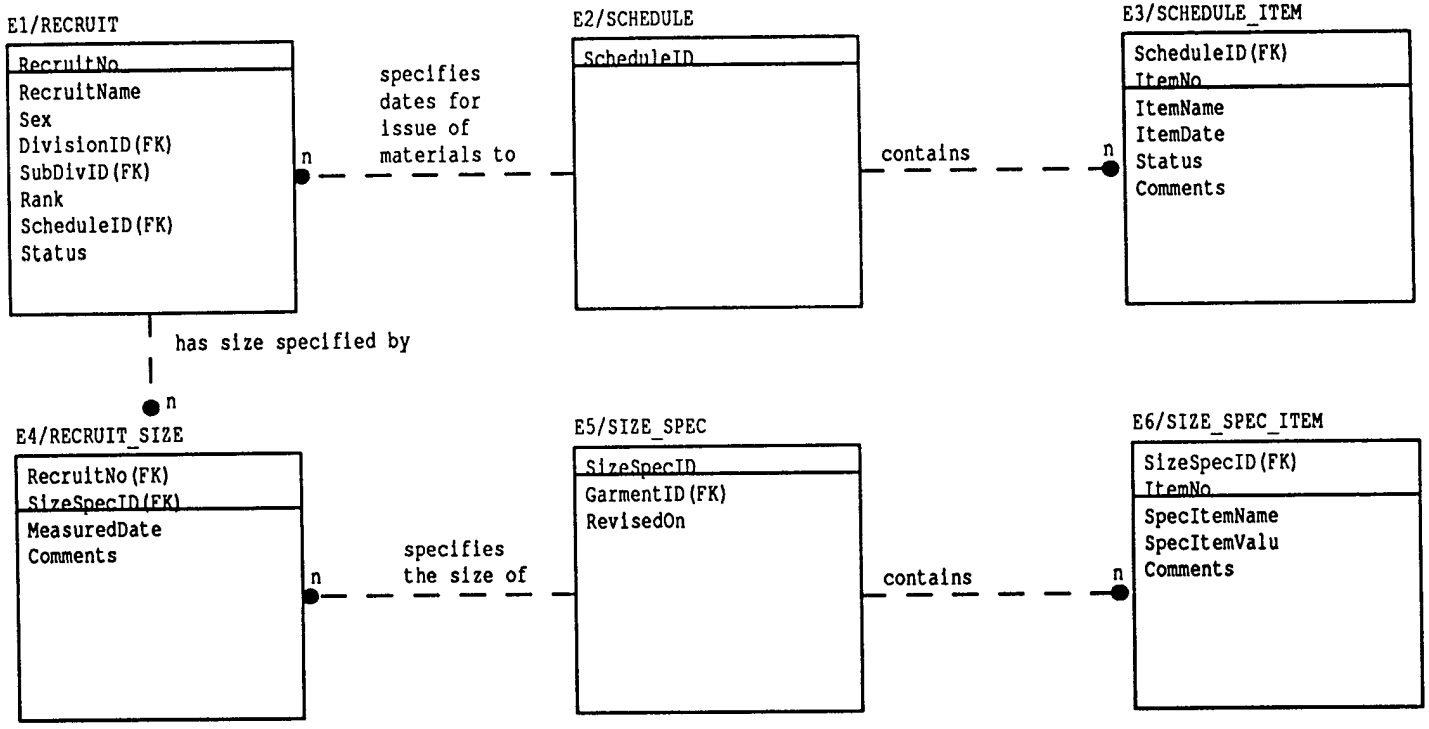

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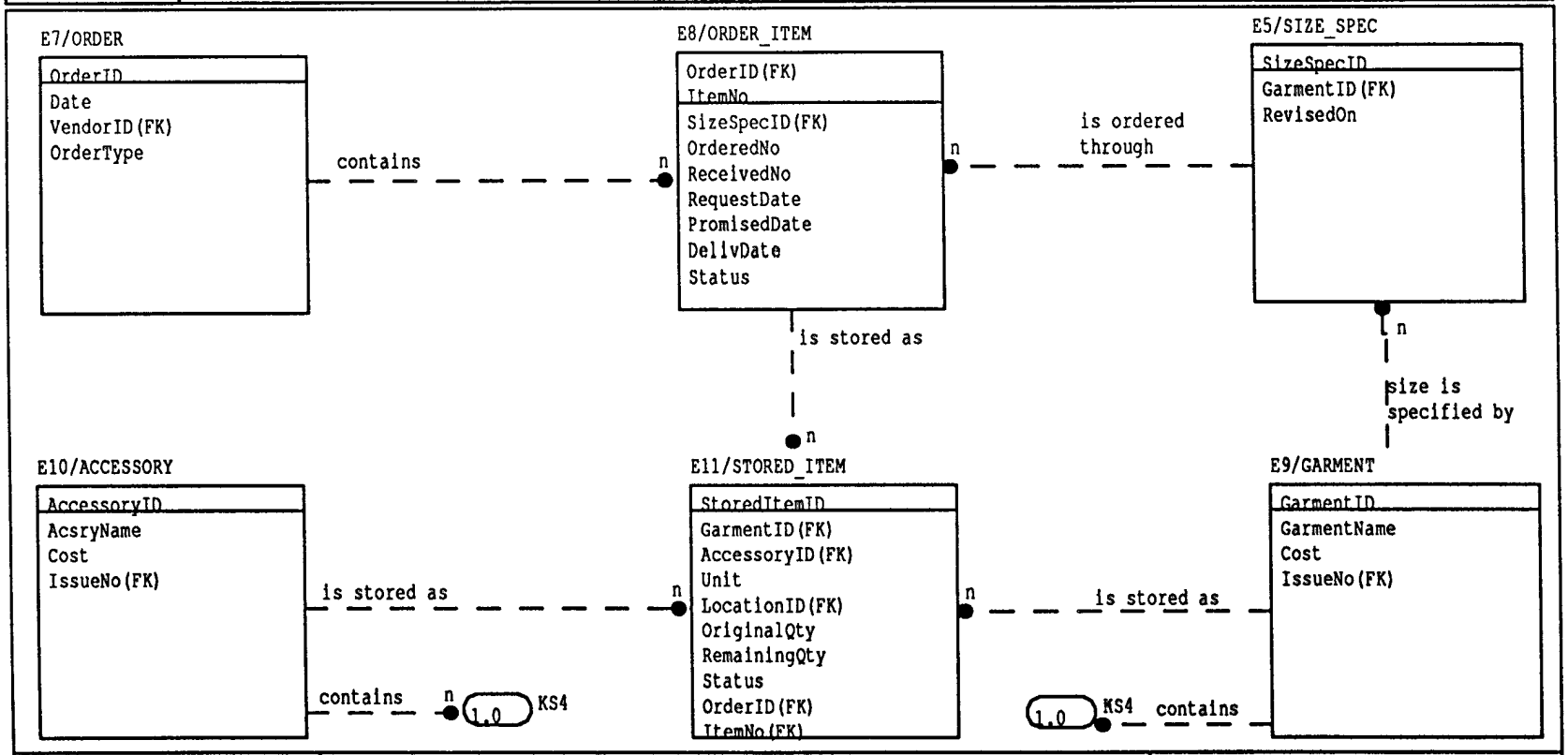

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cdum/F105-0	Purchase and Store Garments and Accessories	KS2

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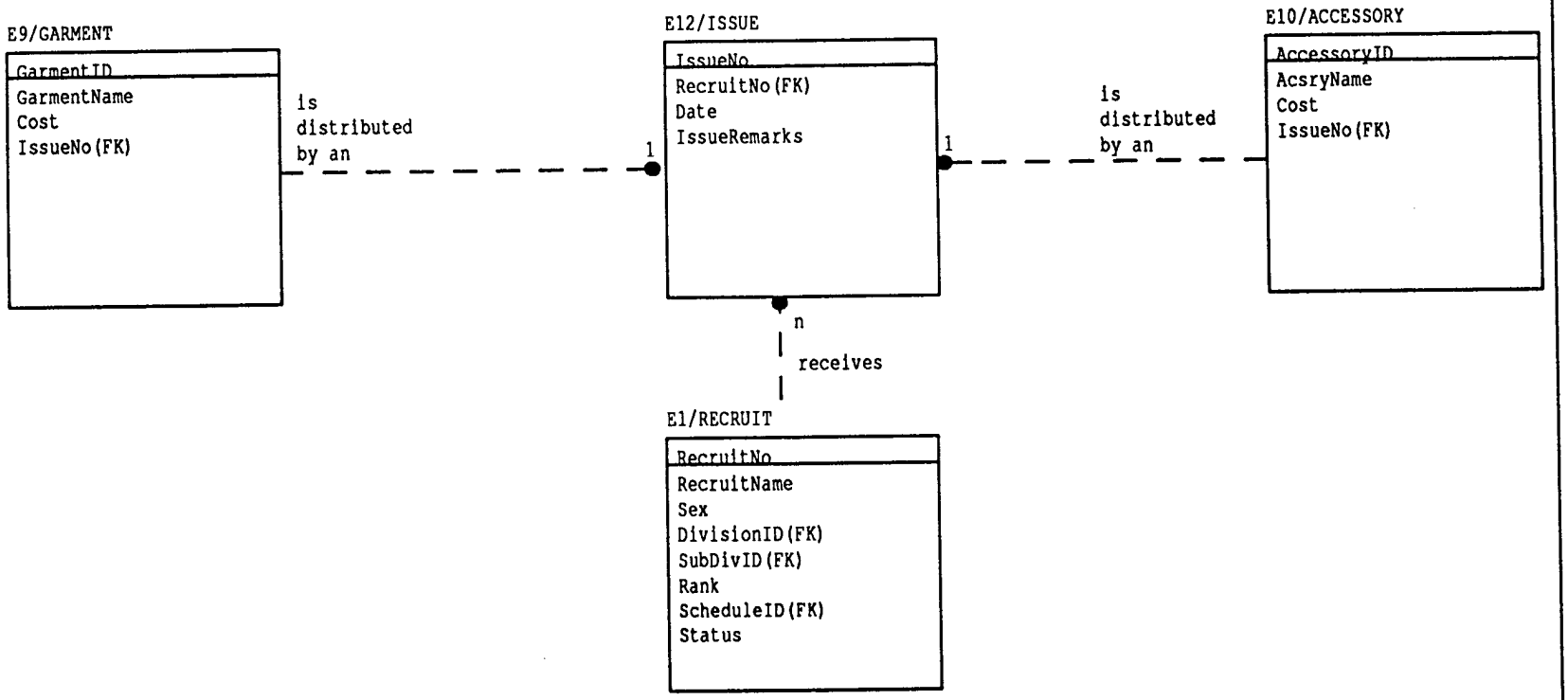

NODE: cdum/F110-0	TITLE: Issue Garments and Accessories	NUMBER: KS3

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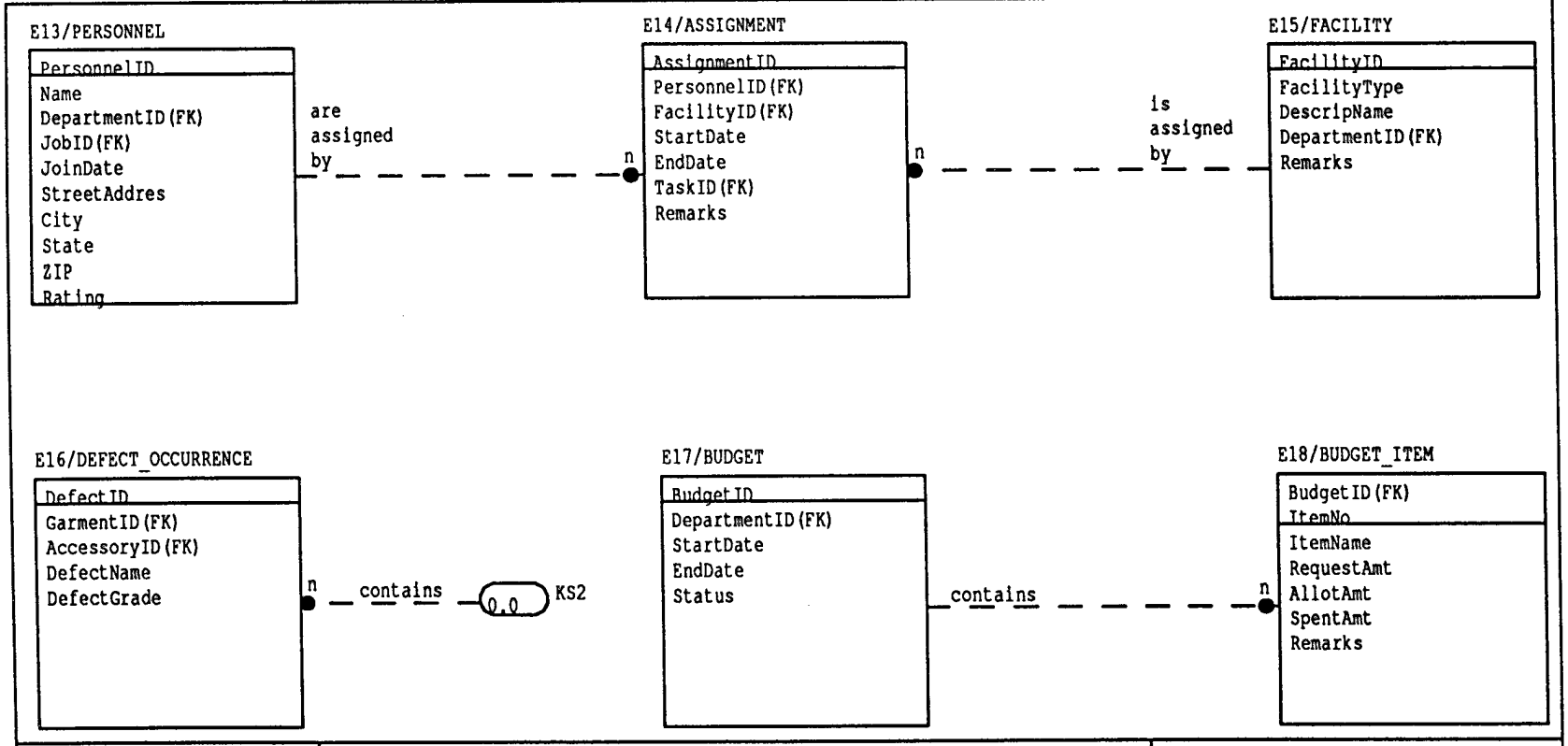

NODE:	TITLE:	NUMBER:
cdum/F115-0	Reports: Resources, Defects and Funds	KS4

TABLE OF ENTITIES AND THEIR ATTRIBUTES

ATTRIBUTE NAME	PK	FK	ATTR TYPE	COMMENT

ENTITY NO: 1 ENTITY NAME: RECRUIT
This entity represents recruits at all stages (from a fresh recruit to a fully clothed recruit).

RecruitNo	Y	N	n	Unique ID for the recruit
RecruitName	N	N	a(30)	Last name, first name
Sex	N	N	a(6)	Male/Female
DivisionID	N	Y	*	Major division recruited for
SubDivID	N	Y	*	Sub-division recruited for
Rank	N	N	a(30)	Recruit's rank
ScheduleID	N	Y	*	Issuing schedule for recruit
Status	N	N	m	Current status

ENTITY NO: 2 ENTITY NAME: SCHEDULE
Dates on which a group of recruits are to be issued towels, accessories, uniforms, and so on.

ScheduleID	Y	N	a(30)	Unique ID for a schedule

ENTITY NO: 3 ENTITY NAME: SCHEDULE_ITEM
Each item on a schedule, e.g., Issue Towel and Issue Work Uniform.

ScheduleID	Y	Y	*	Schedule to which item belongs
ItemNo	Y	N	n(3)	Ordinal # within the schedule
ItemName	N	N	a(30)	"Issue Towel," etc.
ItemDate	N	N	d	Scheduled date
Status	N	N	a(30)	"Issued," "Pending," etc.
Comments	N	N	m	Notes on problems, etc.

ENTITY NO: 4 ENTITY NAME: RECRUIT_SIZE
Each record in this table gives the size spec. of a recruit for a particular garment.

RecruitNo	Y	Y	*	
SizeSpecID	Y	Y	*	
MeasuredDate	N	N	d	Date on which recruit was measured
Comments	N	N	a(30)	Notes on special requirements, etc.

n: Number; a(x): Alphanumeric string of length x; d: date; m: memo; $: Currency

ATTRIBUTE NAME	PK	FK	ATTR TYPE	COMMENT

ENTITY NO: 5 ENTITY NAME: SIZE_SPEC

Size Spec is used to specify the size of an actual garment or the measurement of a recruit.

SizeSpecID	Y	N	a(30)	ID for a particular size
GarmentID	N	Y	*	Garment whose size is specified
RevisedOn	N	N	d	Latest revision date

ENTITY NO: 6 ENTITY NAME: SIZE_SPEC_ITEM

Size specification for each feature in a garment, e.g., sleeve length of a coat.

SizeSpecID	Y	Y	*	
ItemNo	Y	N	n(2)	Feature number
SpecItemName	N	N	a(30)	Name of the feature
SpecItemValu	N	N	n	Specific value for the feature
Comments	N	N	m	Notes on any special requirements

ENTITY NO: 7 ENTITY NAME: ORDER

Purchase order for one or more garment types.

OrderID	Y	N	a(30)	Unique number for each order
Date	N	N	d	Date of issue of order
VendorID	N	Y	*	Vendor to whom order was sent
OrderType	N	N	a(30)	Special order or stock order

ENTITY NO: 8 ENTITY NAME: ORDER_ITEM

Each item in a purchase order (for a particular item).

OrderID	Y	Y	*	Order to which the item belongs
ItemNo	Y	N	n	Ordinal # within the order
SizeSpecID	N	Y	*	Size of the garment ordered
OrderedNo	N	N	n	Number of garments ordred
ReceivedNo	N	N	n	Number of garments received
RequestDate	N	N	d	Date on which delivery was requested
PromisedDate	N	N	d	Date on which delivery was promised
DelivDate	N	N	d	Date on which delivery was made
Status	N	N	a(30)	"Delivered," "Cancelled," etc.

n: Number; a(x): Alphanumeric string of length x; d: date; m: memo; $: Currency

ATTRIBUTE NAME	PK	FK	ATTR TYPE	COMMENT

ENTITY NO: 9 ENTITY NAME: GARMENT

Representation of all types of garments. The recruit to whom a garment has been issued can be found through the issue number.

GarmentID	Y	N	a(30)	Unique ID for each garment
GarmentName	N	N	a(30)	Descriptve name for the garment
Cost	N	N	$	Standard cost
IssueNo	N	Y	*	ID for garment issue

ENTITY NO: 10 ENTITY NAME: ACCESSORY

Includes accessories and towels.The recruit to whom a towel/accessory item has been issued can be found through the issue number.

AccessoryID	Y	N	a(30)	Unique ID for each accessory
AcsryName	N	N	a(30)	Descriptive name for the accessory
Cost	N	N	$	Standard cost
IssueNo	N	Y	*	ID for accesory issue

ENTITY NO: 11 ENTITY NAME: STORED_ITEM

Inventory unit: includes both garments and accessories.

StoredItemID	Y	N	a(30)	ID for the inventory unit
GarmentID	N	Y	*	Applicable if the item is a garment
AccessoryID	N	Y	*	Applicable if the item is an accsry.
Unit	N	N	a(30)	Unit of measure (e.g., doz. and box)
LocationID	N	Y	*	Current location
OriginalQty	N	N	n	Originally stored quantity.
RemainingQty	N	N	n	Currently remaining quantity.
Status	N	N	a(30)	"Allotted," "Available," etc.
OrderID	N	Y	*	P.O. through which purchased
ItemNo	N	Y	*	P.O. Item number

ENTITY NO: 12 ENTITY NAME: ISSUE

Each record represents issue of a particular item to a recruit.

IssueNo	Y	N	n	Unique ID for an issue
RecruitNo	N	Y	*	The recruit to whom issue is made
Date	N	N	d	Date of issue
IssueRemarks	N	N	m	Comments

n: Number; a(x): Alphanumeric string of length x; d: date; m: memo; $: Currency

ATTRIBUTE NAME	PK	FK	ATTR TYPE	COMMENT

ENTITY NO: 13 ENTITY NAME: PERSONNEL

Employees of the uniform distribution center.

PersonnelID	Y	N	a(30)	Unique ID for each employee
Name	N	N	a(30)	Last name, first name
DepartmentID	N	Y	*	Department to which employee belongs
JobID	N	Y	*	Job category
JoinDate	N	N	d	Date of joining
StreetAddres	N	N	a(50)	Street address
City	N	N	a(30)	
State	N	N	a(20)	
ZIP	N	N	n	
Rating	N	N	n	Performance rating of employee

ENTITY NO: 14 ENTITY NAME: ASSIGNMENT

Assignment of an employee or a facility for a task.

AssignmentID	Y	N	a(30)	Unique ID for each assignment
PersonnelID	N	Y	*	Employee being assigned
FacilityID	N	Y	*	Facility being assigned
StartDate	N	N	a(30)	Beginning of assignment period
EndDate	N	N	a(30)	End of assignment period
TaskID	N	Y	*	Task for which assignment is made
Remarks	N	N	m	Comments

ENTITY NO: 15 ENTITY NAME: FACILITY

Resources other than employees (computers, sewing machines for alteration, etc.).

FacilityID	Y	N	a(30)	Unique ID for each facility
FacilityType	N	N	a(50)	Category of the facility
DescripName	N	N	a(50)	Descriptive name of the facility
DepartmentID	N	Y	*	Department to which it belongs
Remarks	N	N	m	Comments

n: Number; a(x): Alphanumeric string of length x; d: date; m: memo; $: Currency

ATTRIBUTE NAME	PK	FK	ATTR TYPE	COMMENT

ENTITY NO: 16 ENTITY NAME: DEFECT_OCCURRENCE
Record of defect occurrences in garments and accessories.

DefectID	Y	N	a(30)	Unique ID for each defect occurrence
GarmentID	N	Y	*	Garment in which defect is found
AccessoryID	N	Y	*	Accessory in which garment is found
DefectName	N	N	a(30)	Descriptive name of the defect
DefectGrade	N	N	a(15)	Severity of the defect

ENTITY NO: 17 ENTITY NAME: BUDGET
Allocation of funds for a department in a particular period.

BudgetID	Y	N	a(30)	Unique ID for a budget
DepartmentID	N	Y	*	Department to which budget applies
StartDate	N	N	d	Beginning of budget period
EndDate	N	N	d	End of budget period
Status	N	N	a(30)	"Proposed," "Approved," etc.

ENTITY NO: 18 ENTITY NAME: BUDGET_ITEM
Each record shows the allocation and the actual spending for each item in a budget.

BudgetID	Y	Y	*	Budget to which item belongs
ItemNo	Y	N	n	Ordinal # within the budget
ItemName	N	N	a(30)	Description of the budget item
RequestAmt	N	N	$	Requested amount
AllotAmt	N	N	$	Allotted amount
SpentAmt	N	N	$	Actually spent amount
Remarks	N	N	m	Reason for over/under spending, etc.

n: Number; a(x): Alphanumeric string of length x; d: date; m: memo; $: Currency